

I. Sketch each of the following angles in standard position.

1.  $150^\circ$                       2.  $-120^\circ$                       3.  $-\frac{7\pi}{4}$                       4.  $\frac{2\pi}{3}$

II. Determine the quadrant in which the terminal side of the angle lies.

5.  $130^\circ$  \_\_\_\_\_                      6.  $-336^\circ$  \_\_\_\_\_                      7.  $285^\circ$  \_\_\_\_\_
8.  $-260^\circ$  \_\_\_\_\_                      9.  $\frac{22\pi}{3}$  \_\_\_\_\_                      10.  $\frac{7\pi}{5}$  \_\_\_\_\_
11.  $-\frac{17\pi}{3}$  \_\_\_\_\_                      12.  $-\frac{\pi}{12}$  \_\_\_\_\_                      13.  $3.5$  \_\_\_\_\_
14.  $-1$  \_\_\_\_\_

III. Give 2 coterminal angles, one positive and one negative for each of the following.

15.  $34^\circ$  \_\_\_\_\_                      16.  $-45^\circ$  \_\_\_\_\_
17.  $-120^\circ$  \_\_\_\_\_                      18.  $300^\circ$  \_\_\_\_\_
19.  $\frac{4\pi}{3}$  \_\_\_\_\_                      20.  $\frac{11\pi}{6}$  \_\_\_\_\_
21.  $-\frac{7\pi}{6}$  \_\_\_\_\_                      22.  $\frac{\pi}{4}$  \_\_\_\_\_

IV. Express each of the following in radian measure. Leave your answer in terms of  $\pi$ .

23.  $150^\circ$  \_\_\_\_\_                      24.  $315^\circ$  \_\_\_\_\_                      25.  $-240^\circ$  \_\_\_\_\_
26.  $115^\circ$  \_\_\_\_\_                      27.  $345^\circ$  \_\_\_\_\_                      28.  $-216^\circ$  \_\_\_\_\_

V. Express each of the following in degree measure.

29.  $\frac{5\pi}{9}$  \_\_\_\_\_

30.  $-\frac{7\pi}{12}$  \_\_\_\_\_

31.  $\frac{11\pi}{5}$  \_\_\_\_\_

VI. Find the angle in radian measure between 0 and  $2\pi$  which is coterminal with the following.

32.  $\frac{11\pi}{4}$  \_\_\_\_\_

33.  $\frac{23\pi}{4}$  \_\_\_\_\_

34.  $\frac{31\pi}{6}$  \_\_\_\_\_

35.  $\frac{40\pi}{3}$  \_\_\_\_\_

36.  $-\frac{19\pi}{3}$  \_\_\_\_\_

37.  $121\pi$  \_\_\_\_\_

38.  $\frac{62\pi}{5}$  \_\_\_\_\_

VII. Find the reference angle for each of the following.

39.  $208^\circ$  \_\_\_\_\_

40.  $\frac{7\pi}{4}$  \_\_\_\_\_

41.  $\frac{14\pi}{5}$  \_\_\_\_\_

42.  $-292^\circ$  \_\_\_\_\_

43.  $-\frac{5\pi}{3}$  \_\_\_\_\_

44.  $-445^\circ$  \_\_\_\_\_

45.  $\frac{13\pi}{9}$  \_\_\_\_\_

46.  $517^\circ$  \_\_\_\_\_

47.  $-165^\circ$  \_\_\_\_\_

48.  $\frac{17\pi}{6}$  \_\_\_\_\_

49.  $322^\circ$  \_\_\_\_\_

50.  $-\frac{12\pi}{7}$  \_\_\_\_\_